

CLAIM(S)

What is claimed is :

- 5    1.    A melt spinning process for spinning polymeric  
         filaments, comprising  
         passing a polymeric melt of a polymer formed from one  
         or more chain-branching agents through a spinneret to  
         form polymeric filaments,
- 10   passing the filaments to a pneumatic quench zone,  
         wherein a cooling gas is provided to the filaments to  
         cool the filaments, wherein the cooling gas is directed  
         to travel in the same direction as the direction of the  
         filaments.
- 15   2.    A process as claimed in claim 1, wherein the  
         cooling gas is provided to the filaments in a single  
         stage and passes through a tapered section and a zone  
         of restricted dimensions to accelerate the gas.
- 20   3.    A process as claimed in claim 1, wherein the  
         cooling gas is provided to the filaments in two stages,  
         and wherein the gas is accelerated by a converging  
         section in the quench zone.
- 25   4.    A process as claimed in claim 1, further  
         comprising gathering the filaments to form a yarn.
- 30   5.    A process as claimed in claim 1, wherein the  
         polymer comprises a polyester.
6.    A process as claimed in claim 1, wherein the  
         polymer comprises polyethylene terephthalate.

7. A process as claimed in claim 1, wherein the chain branching agents comprise a tri or higher functional acid, alcohol, or ester.
- 5 8. A process as claimed in claim 1, wherein the chain branching agent comprises trimethyl trimellitate.
9. A process as claimed in claim 1, wherein a yarn formed from the produced filaments has a denier spread  
10 of less than about 2 and the filaments have a denier per filament of greater than about 4.
10. A process as claimed in claim 1, wherein a yarn formed from the produced filaments has a denier spread  
15 of less than about 1.5 and a denier per filament of less than about 4.
11. A process as claimed in claim 1, wherein the polymer has a laboratory relative viscosity of above  
20 22.
12. A process as claimed in claim 1, wherein the filaments travel through the quench zone at a speed of greater than about 3,500 meters per minute.  
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13. A process as claimed in claim 1, wherein the filaments travel through the quench zone at a speed of greater than about 4,000 meters per minute.
- 30 14. Filaments produced by the process of claim 1.
15. An article formed from the filaments of claim 14.

16. A melt spinning process for spinning polymeric filaments, comprising

passing a polymeric melt of a polymer through a spinneret to form polymeric filaments having a denier  
5 per filament above about 4,

passing the filaments to a quench zone, wherein a cooling gas is provided to the filaments to cool the filaments, wherein the cooling gas is directed to travel and accelerated in the same direction as the  
10 direction of the filaments,

whereby a yarn formed from the produced filaments has a denier spread of less than 2.

17. A melt spinning process as claimed in claim 16,  
15 wherein the filaments have a denier per filament above about 5.

18. A melt spinning process as claimed in claim 16, wherein the polymer comprises polyethylene  
20 terephthalate.

19. A melt spinning process for producing polymeric filaments having a denier spread of below about 2, comprising  
25 passing a polymeric melt of a polymer having a laboratory relative viscosity above 22.5 through a spinneret to form polymeric filaments,  
passing the filaments to a quench zone, wherein a cooling gas is provided to the filament array to cool  
30 the filaments, wherein the cooling gas is directed to travel and accelerated in the same direction as the direction of the filaments.

20. A method of producing polyester yarn have a denier spread of less than about 2%, comprising forming filaments from a polyester containing one or more chain-branching agents having a laboratory relative viscosity above 22.5, and forming the filaments into a yarn.

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